

AES Huntington Beach

316(b) Compliance Update for the Huntington Beach Generating Station

January 18, 2007



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AES HGBS 316(b) Compliance Support Team



MBC



ALDEN

Solving Flow Problems Since 1894

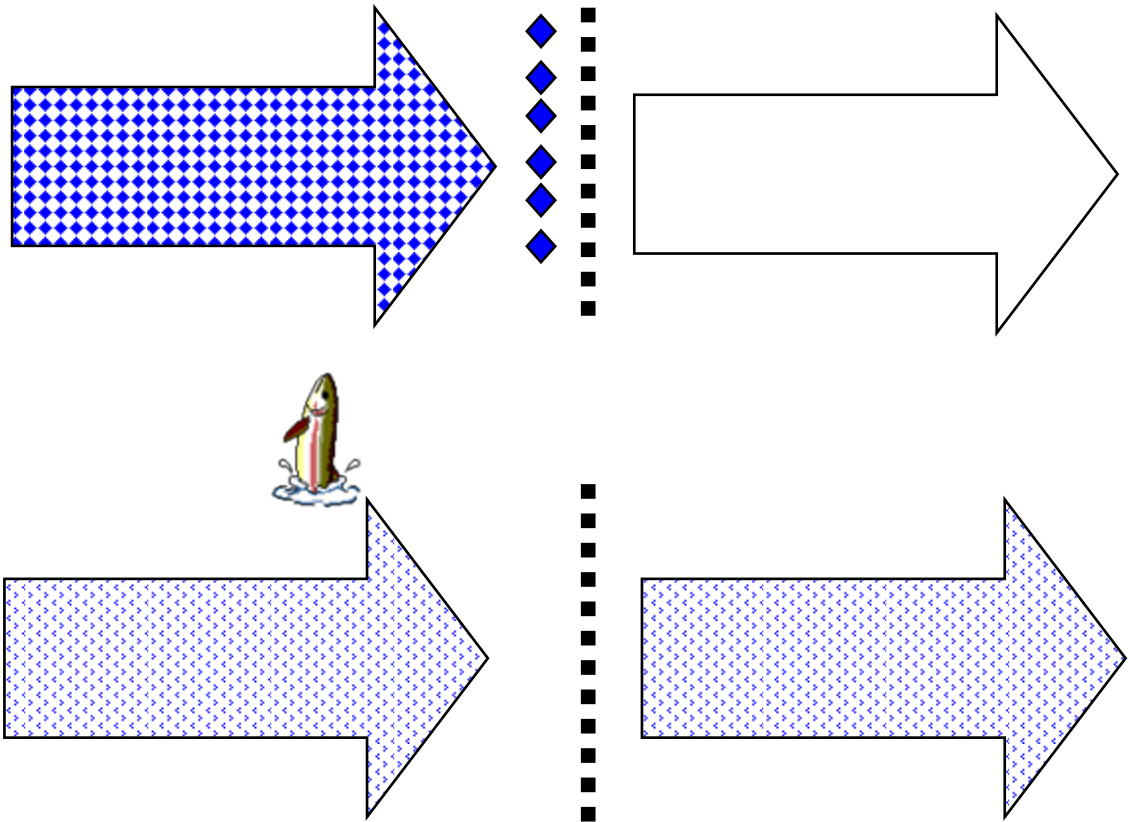


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Rule Overview

Impingement vs Entrainment

- Impingement
 - Organisms are trapped on intake screens – Reduce by 80% - 95% (95% in HB)
 - GS permit)
- Entrainment
 - Organisms pass through cooling system – Reduce by 60% - 90% (90% in HBGS permit)





Final Phase II Rule Designed to Recognize Issue of Site Specificity

5 Compliance Alternatives:

- Flows commensurate with wet closed-cycle cooling or 0.5 fps maximum through screen design velocity (IM only)
- Technologies &/or operational measures &/or restoration measures in place
- Propose use of new technologies &/or operational measures &/or restoration measures
- Use of approved technologies
- Use of site specific standards



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Other 316(b) Phase II Rule Provisions

- Submit a Proposal for Information Collection (PIC) that describes:
 - ✓ Summary of Existing Biological Studies
 - ✓ Description of plans for any new studies
 - ✓ Plans for evaluating technologies and operational measures
- Use of “calculation baseline” to provide credit for existing use of fish protection technologies, operational measures and/or restoration measures
- Submit a Comprehensive Demonstration Study (CDS) based on the Compliance Alternatives and Options selected to comply.
- CDS to be submitted in January of 2008



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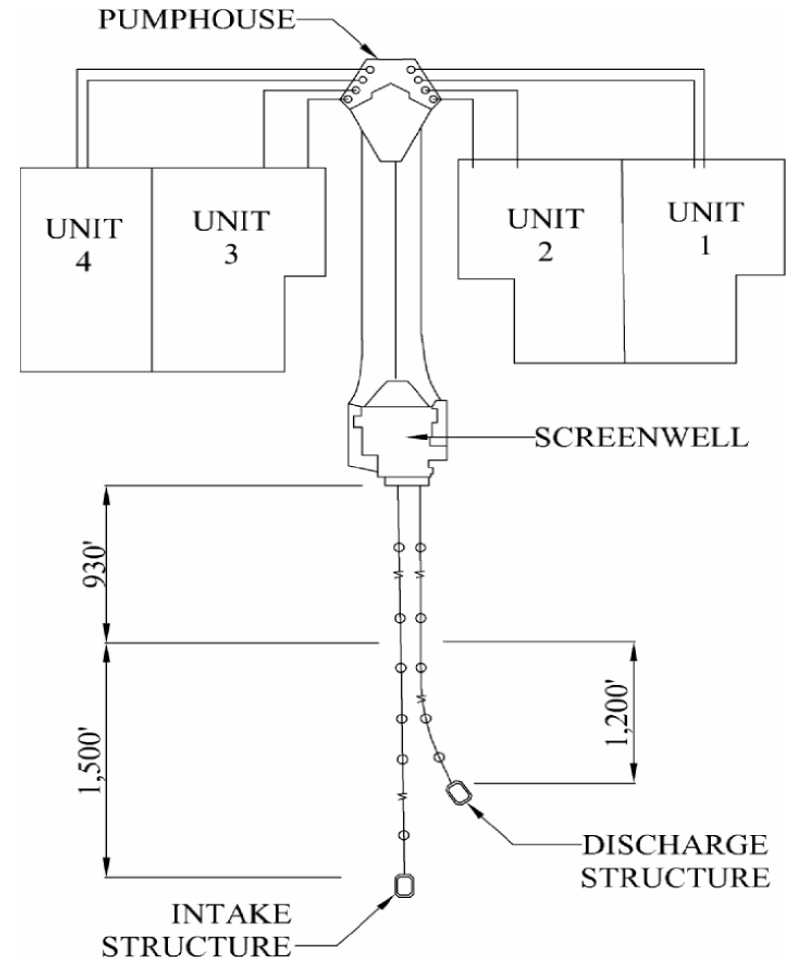
Facility Description



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Huntington Beach Generating Station (HBGS)

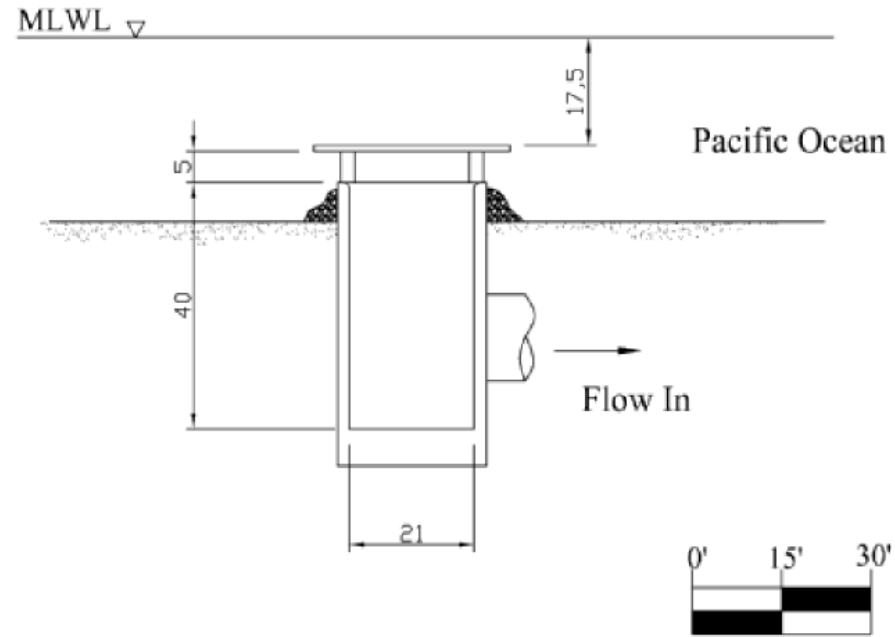
- Located along Pacific Coast in Huntington Beach, California.
- Units 1-4 Rated at 880 MW total and use once through cooling
- Each Unit has 2 cooling water pumps. Units 1-3 pumps are rated at 44,000 gpm (98 cfs) while the 2 pumps for Unit 4 are 46,300 gpm (103 cfs) for a total cooling water flow of 356,600 gpm (784.5 cfs)





Deviations from the Calculation Baseline

- Deviations from the Rule's Calculation Baseline include:
 - Offshore CWIS Location
 - Submerged*
 - Velocity Cap *
- *potential to provide a fish protection benefit
- HBGS velocity cap benefit discussed in peer reviewed literature





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Compliance Alternatives and Options to Be Evaluated

- All of the Rule's compliance alternatives and options will be considered at HBGS
- Due to existing use of fish protection technologies and restoration measures, AES plans to include use of Compliance Alternative 2 for restoration measures being implemented and velocity cap credit.
- Fish protection technologies and operational measures will be evaluated, regardless of the Compliance Alternative(s) and options selected.



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Impingement and Entrainment Studies



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Study Timeline

- 2000 AES submits application to retool Units 3&4 to the CEC
- 2001 CEC requires one-year IM&E study
- 2003-4 IM&E study conducted
- 2005 Final Report submitted
- 2006 AES, CEC, and HBWC draft an agreement for restoration of 66.8 acres of wetlands at Huntington Beach



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Study Oversight

- AES Huntington Beach
- Santa Ana RWQCB
- CEC
- CDFG
- NMFS
- U.S. Fish and Wildlife

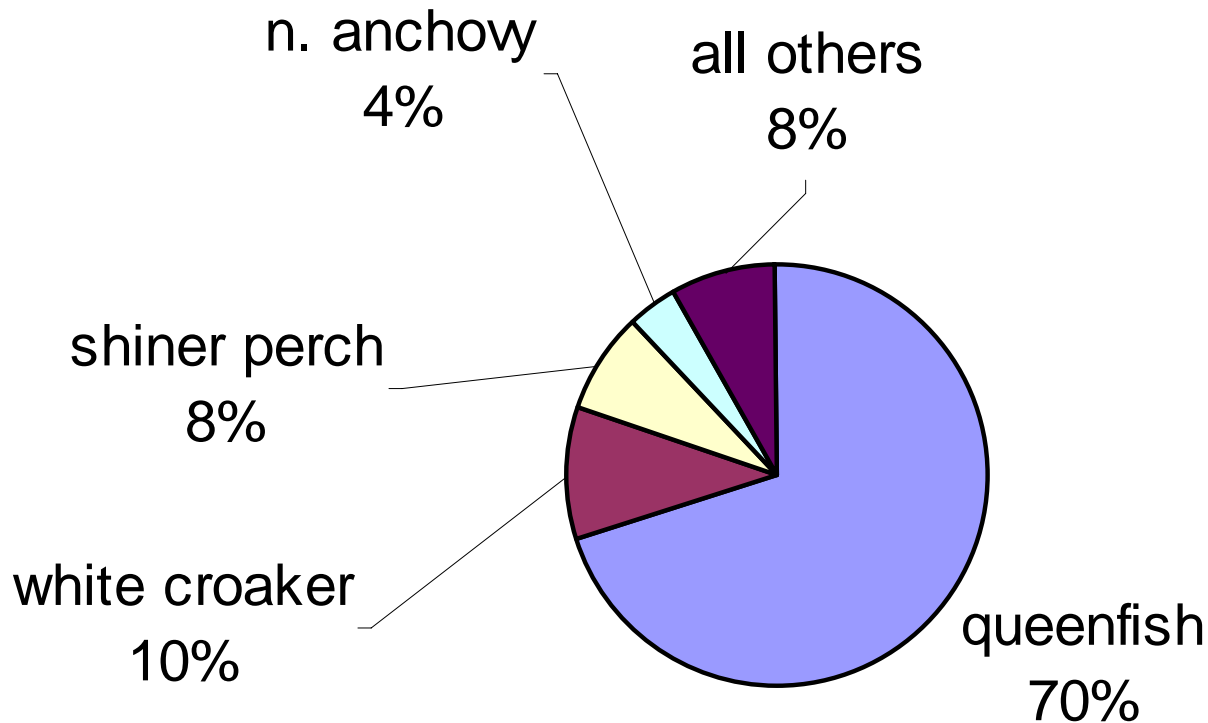
The working group provided comments on the design of the study, quarterly data reports, draft reports, and mitigation recommendations.



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Impingement Results

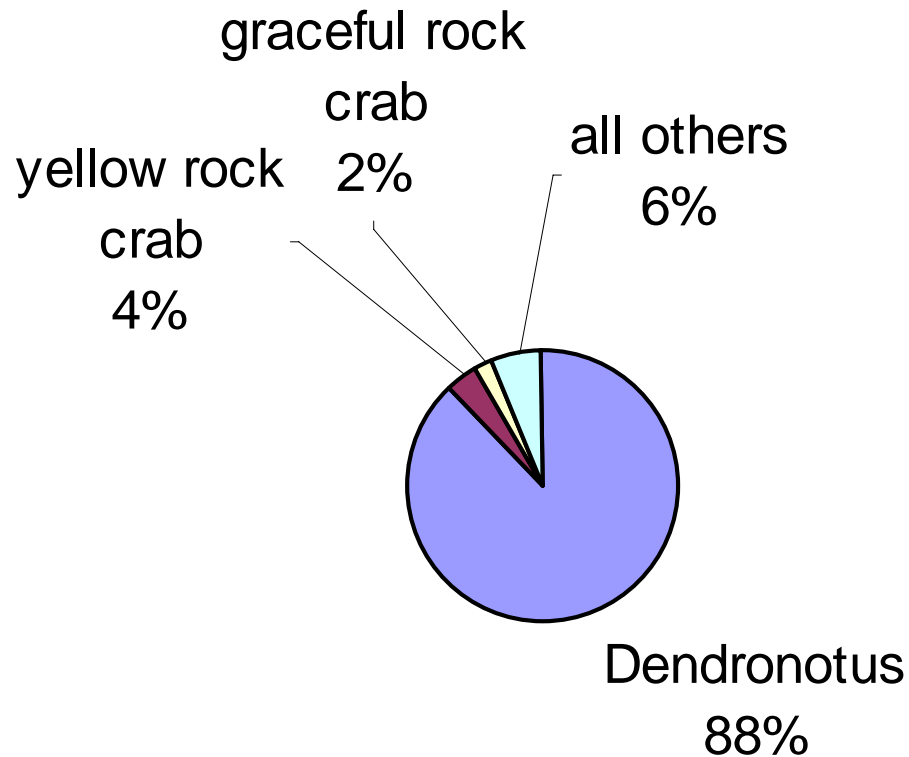
Fish Impingement





Impingement Results (Cont.)

Invertebrate Impingement

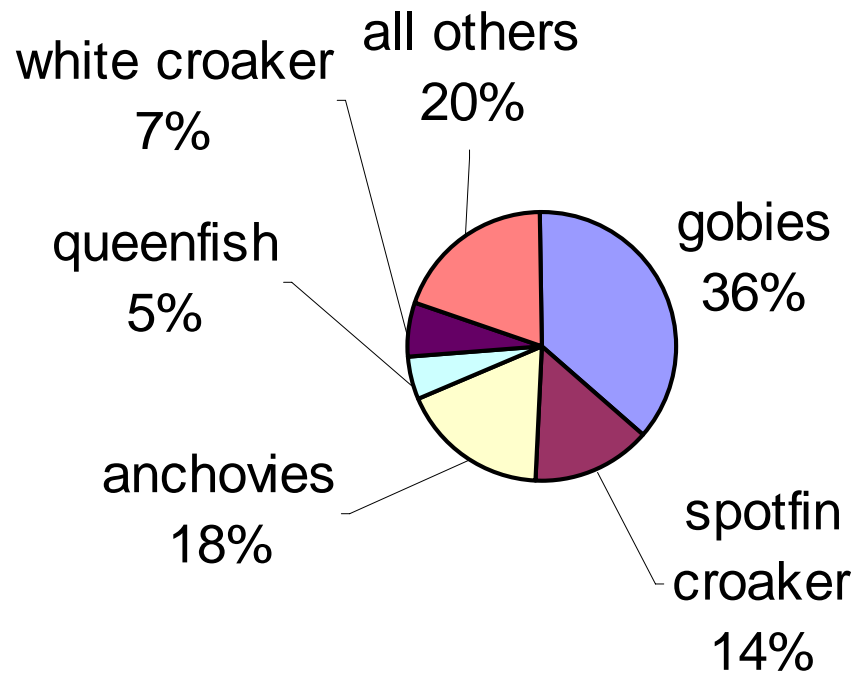




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Finfish Entrainment Results

Entrainment

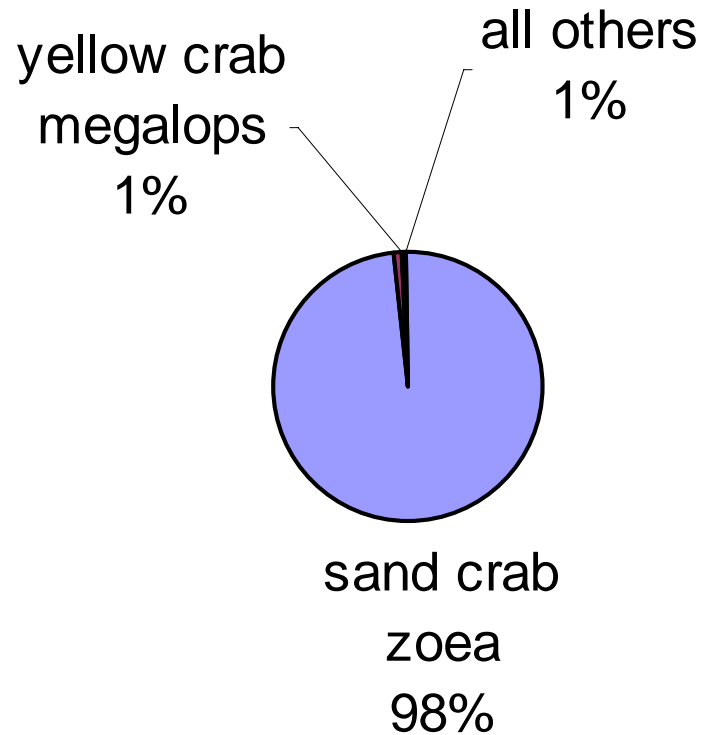




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Shellfish Entrainment Results

Invertebrate Entrainment





Calculation Baseline

AES submitted proposed methodology for Calculation Baseline estimate in fall 2006:

- Data from 2003-4 IM&E Study
- Flow data from 2004-5 used (post retool)
- Analysis accounted for intra-annual flow variations
- Estimate took into account published effectiveness of the velocity cap in reducing impingement



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Technologies and Operational Measures to Be Evaluated

Fish Protection Entrainment Technologies and Operational Measures to be Evaluated at HBGS

- **Fine Mesh**
- Traveling Screens**
- **Narrow Slot**
- Wedgewire**
- Screens**
- **Variable Speed**
- Pumps**
- **AFB Not Feasible**
- **Monitor**
- Development of**
- New Technologies**

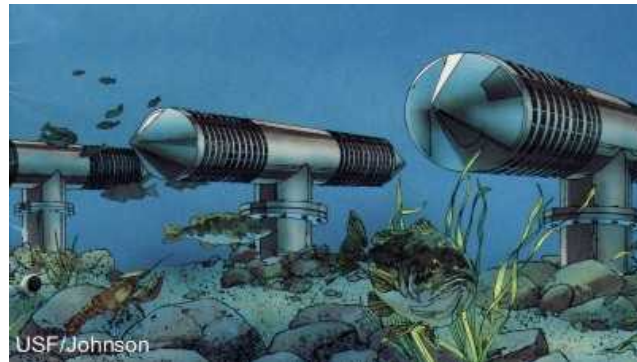




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Fish Impingement Protection Technologies and Operational Measures

- Coarse Mesh Traveling Screens
- Wide Slot Wedgewire Screens
- Behavioral Devices





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Evaluation of Closed-Cycle Cooling

- Wet and dry closed-cycle cooling will be evaluated.
- Feasibility Issues:
 - Net adverse environmental impacts
 - Salt water cooling tower requirements (i.e. can it achieve a 90% reduction)
- Cost – Being evaluated in terms of site-specific constraints (i.e. integration into existing generation system.)





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Restoration Measures



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AES Using Restoration to Mitigate HBGS Unit 3&4 Entrainment Losses Under BIO-5

- Using results from ETM calculations, it was determined that restoration of 66.8 acres of nearshore habitat would replace the production lost due to entrainment
- CEC required funding of restoration project at the adjacent H.B. Wetlands
- Project includes restoration, monitoring, maintenance, and education
- Funding occurred in 2006





Compliance Alternative 1 Using Restoration Measures

- Currently HBGS can use the restoration measures it is implementing for compliance under Compliance Alternative 2. However, use of restoration is a Federal Rule litigation issue.
- AES will evaluate additional restoration necessary to offset entrainment losses for Units 1&2 and for impingement as necessary.
- Required Restoration Plan must include:
 - An Adaptive Management Plan will be developed to ensure that the wetland design objectives are achieved and
 - A Verification Monitoring Plan will be developed.



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Velocity Cap Credit



Calculation Baseline for Impingement

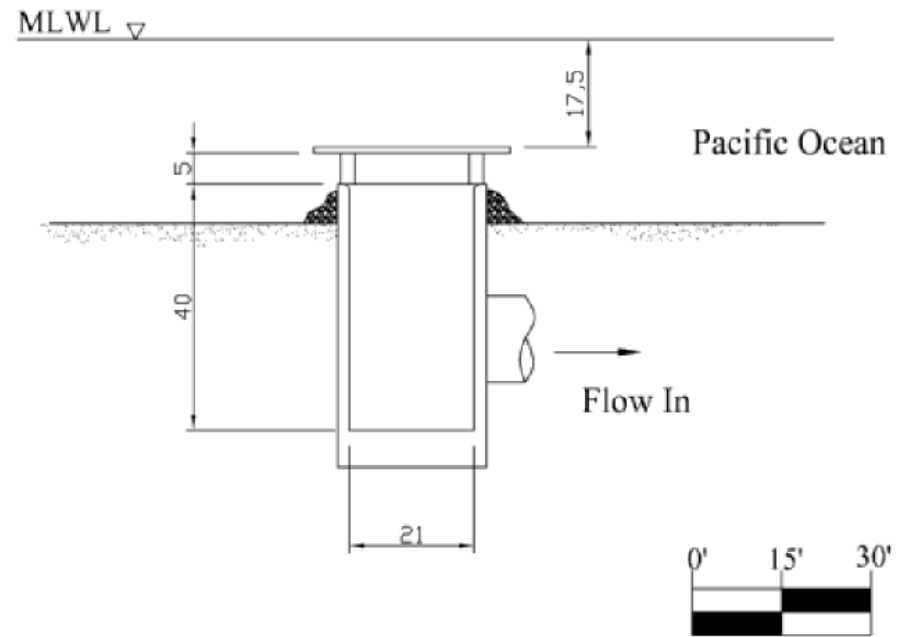
Rule also allows:

- Credit for use of design technologies and/or operational measures that do not conform to the baseline under Compliance Alternative 2
- Calculation baseline to be estimated using:
 - Historical data collected at the facility
 - Data from another facility
 - Source waterbody data
 - New data collected at the facility



Use of Compliance Alternative 2 for HBGS Technologies

- Impingement:
 - HBGS uses a submerged offshore velocity cap to reduce impingement
 - Velocity caps in general have been demonstrated to reduce impingement





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Approach for Velocity Cap Credit at HBGS

- AES recognizes that technical support must be provided for the calculation baseline estimate.
- The calculation baseline estimate using existing HBGS information was based on verification:
 - ✓ Of technically sound methods used to collect data
 - ✓ That dominant species were the same as current dominant impinged species when study was conducted
 - ✓ Of technically sound analytical methods.



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Comparison of HBGS 78/80 Impingement Study to – July 03-July 04 Impingement Study

Species	% # 78/80	% # 03/04	% Wt 03/04
Queenfish	64.4	70.2	50.2
White Croaker	11.3	9.6	7.4
Shiner Perch	0.8	7.9	4.0
Northern Anchovy	6.8	4.3	1.2
White Seaperch	3.0	1.7	1.5
Pacific Butterfish	3.3	1.2	1.2
Walleye Surfperch	7.5	0.9	1.2
Jacksnelt		0.7	2.3
Kelp Bass	1.2	0.3	3.6
Round Stingray		0.2	3.1
California Scorpionfish		0.2	2.1



HBGS Velocity Cap Effectiveness Estimate

Year	Velocity Cap	Species (time)	Entrapment Density	Effectiveness
1980	No	All (daytime)	47.2 kg/hr	
1980	Yes	All (daytime)	0.65 kg/hr	99%
1980	No	All (nighttime)	52.99 kg/hr	
1980	Yes	All (nighttime)	6.78 kg/hr	87%
1980			Average:	93%
1979	No	All (day/night 18 hr)	20.45 kg/hr	
1979	Yes	All (day/night 18 hr)	1.97 kg/hr	90%
1979	No	All (nighttime)	32.93 kg/hr	
1979	Yes	All (nighttime)	15.53 kg/hr	53%
1979			Average:	72%
1979 and 1980 Combined Effectiveness at least				82%



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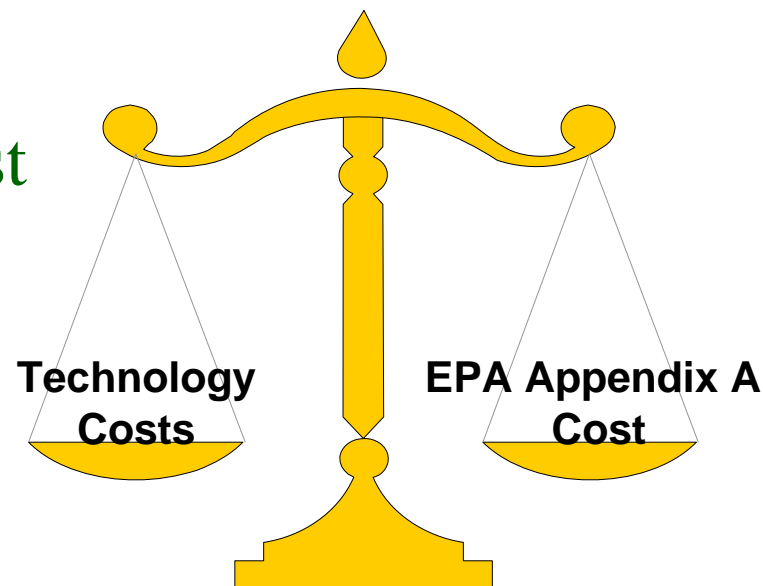
Compliance Alternative 5



Use of Site Specific Standards Under Compliance Alternative 5 in Rule

Cost-Cost Test:

- Compare Rule's Appendix A cost to detailed site specific cost to deploy technologies and/or operational measures and/or restoration measures.
- If site specific costs to employ technologies and/or operational measures are determined to be significantly greater than Appendix A costs they would not be required.





HBGS Cost-Cost Test

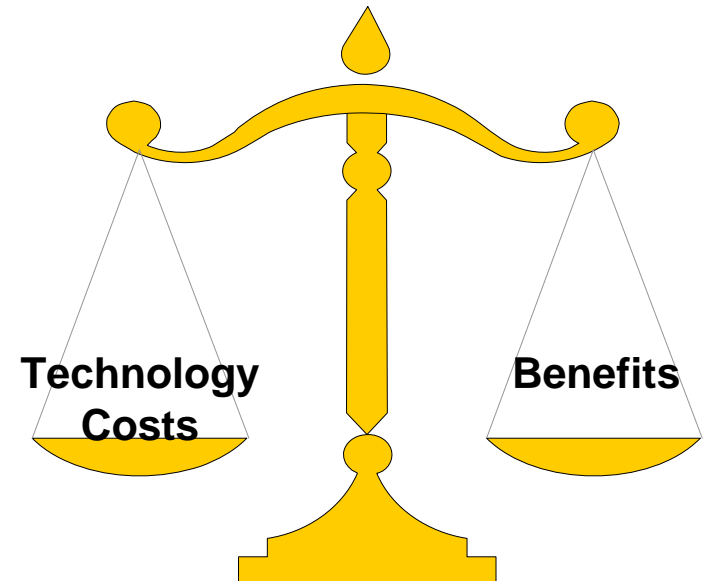
- HBGS listed as facility AUT0612
- EPA assumed use of narrow slot wedgewire screens for HBGS.
- The flow adjusted (i.e. EPA estimate was prior to repowering of Units 3&4) Appendix A annualized capital cost (\$12,175,375) and O&M (\$164,750) cost spread over 20 years) was estimated to be \$2,227,964/yr



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Use of Site Specific Standards Under Compliance Alternative 5 in Rule

- Cost-Benefit Test:
- Compare site specific costs of technologies to environmental benefit
- Operational measures and/or restoration measures to the economic benefit value of a 60% - 90% reduction in entrainment





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AES Current Evaluation Activity

- Evaluation of wet or dry closed-cycle cooling in progress
- Proceed with analysis to update feasibility, effectiveness and cost of technologies
- Proceed with analysis of environmental economic benefit for Compliance Alternative 5



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Questions